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(71)Applicant : **MATSUSHITA ELECTRIC IND CO LTD**
(72)Inventor : **CHUN SEN BUN**
SHEN MEI SHEN
TAN THIOW KENG

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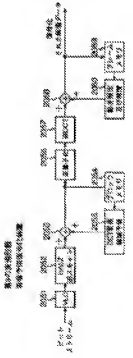
(54) DEVICE AND METHOD FOR PREDICTIVE DECODING OF IMAGE

(57)Abstract:
PROBLEM TO BE SOLVED: To more efficiently decode image data by eliminating redundancy in a block, in comparison with the conventional technology.
SOLUTION: A quantized AC coefficient of a predicted block scaled, by using the ratio of a quantization step size of a current block (C) to a quantization step size of the predicted block is added to the AC coefficient data of a quantized two-dimensional column coefficient, to predictively decode the quantized AC coefficient of the current block (C), with respect to the quantized AC coefficient of the predicted block. The quantized AC coefficient of the predictively decoded current block (C) is stored, the quantized AC coefficient of the predictively decoded current block is subjected to inverse quantization, and the inversely quantized AC coefficient is subjected to inverse DCT transformation. The stored quantized AC coefficient is used as the quantized AC coefficient of the selected predicted block, when decoding a block to be decoded which is delayed more than the current block (C).



Claim(s)]

[Claim 1]A picture prediction decoding device which is provided with the following and characterized by using a quantized AC coefficient which was memorized by the above-mentioned memory measure as an AC coefficient by which a prediction block chosen [above-mentioned] was quantized at the time of decryption of a block decrypted later than the above-mentioned current block (C).

A variable-length decoding means which carries out variable-length decryption of the DCT coefficient by which variable length coding was carried out.

A reverse scanning means changed into a two-dimensional sequence coefficient which had a DCT coefficient by which variable-length decryption was carried out [above-mentioned] quantized.

A selecting means which chooses a prediction block for predicting an AC coefficient of the above-mentioned current block (C) from either a top block (A) which adjoins a current block (C), or a left block (B) accommodative.

A scaling means to perform scaling to an AC coefficient (QFa) by which the above-mentioned prediction block was quantized using a ratio of quantization step size of the above-mentioned current block (C), and quantization step size of the above-mentioned prediction block, An AC coefficient (QFax (QPa/QPx)) by which the above-mentioned prediction block by which scaling was carried out by the above-mentioned scaling means was quantized, By adding quantized AC coefficient data (PQFx) of a two-dimensional sequence coefficient which was obtained by the above-mentioned reverse scanning means, An adding means which carries out prediction decryption of the AC coefficient (QFx) by which the above-mentioned current block (C) was quantized, A memory measure which memorizes an AC coefficient by which a current block (C) in which prediction decryption was carried out by the above-mentioned adding means was quantized, An inverse quantization means which carries out inverse quantization of the AC coefficient by which a current block (C) in which prediction decryption was carried out by the above-mentioned adding means was quantized, and a reverse DCT transformation means which carries out reverse DCT transformation of the AC coefficient which was obtained by the above-mentioned inverse quantization means, and by which inverse quantization was carried out.

[Claim 2]It changes into a two-dimensional sequence coefficient which carried out variable-length decryption of the DCT coefficient by which variable length coding was carried out, and had a DCT coefficient by which variable-length decryption was carried out [above-mentioned] quantized, A prediction block for predicting an AC coefficient of the above-mentioned current block (C) is chosen from either a top block (A) which adjoins a current block (C), or a left block (B) accommodative, Scaling is performed to an AC coefficient by which the above-mentioned prediction block was quantized using a ratio of quantization step size of the above-mentioned current block, and quantization step size of the above-mentioned prediction block, By adding AC coefficient data of an AC coefficient by which the above-mentioned prediction block by which scaling was carried out [above-mentioned] was quantized, and a quantized two-dimensional sequence coefficient, Prediction decryption of the AC coefficient by which the above-mentioned current block (C) was quantized is carried out, An AC coefficient by which the above-mentioned current block (C) by which prediction decryption was carried out [above-mentioned] was quantized is memorized, Inverse quantization of the AC coefficient by which the above-mentioned current block (C) by which prediction decryption was carried out [above-mentioned] was quantized is carried out, As an AC coefficient by which a prediction block chosen [above-mentioned] was quantized at the time of decryption of a block which carries out reverse DCT transformation of the AC coefficient by which inverse quantization was carried out [above-mentioned], and is decrypted later than the above-mentioned current block (C), A picture prediction decoding method using a quantized AC coefficient which was memorized [above-mentioned].

[Detailed Description of the Invention]

[0001]

[Field of the Invention]This invention relates to a picture prediction-coding device and a method, a picture prediction decoding device, a method, and a recording medium. It is related with the picture prediction-coding device, the method, picture prediction decoding device, and method for memorizing the digital image data of the picture which is Still Picture Sub-Division or an animation, for example to recording media, such as an optical disc, or transmitting a communication line especially. It is related with the recording medium which recorded the program containing the step of a described image predictive coding method, and the recording medium which recorded the program containing the step of a described image prediction decoding method.

[0002]

[Description of the Prior Art]In order to memorize a digital image efficiently or to transmit it, it is necessary to carry out compression encoding. The discrete cosine transform represented by JPEG (Joint PhotographicExperts Group) and MPEG (Motion Picture Experts Group) as a method for carrying out compression encoding of the digital image (hereafter) It is called DCT transformation. There are the other waveform-coding methods, such as sub band coding, wavelet coding, fractal coding. For removing the redundant signal between pictures, prediction between pictures using a motion compensation is performed, and waveform coding of the differential signal is carried out.

[0003]In the method of MPEG, an inputted image is divided into two or more macro blocks of 16x16, and is processed. One macro block is divided into the block of further 8x8, and after performing DCT transformation processing of 8x8, it quantizes. This is called frame inner code-ization.

[0004]On the other hand, the smallest prediction macro block with error is detected to an object macro block by the motion detection methods including block matching out of another frame which adjoins time, The detected prediction macro block is subtracted from an object macro block, and a difference macro block is generated, and after performing DCT transformation of 8x8, it quantizes. This is called interframe coding and a prediction macro block is called the prediction signal of a segment of time. Thus, in MPEG, the picture is not predicted out of the same frame.

[0005]The usual picture can have many fields which are spatially alike, and can approximate a picture to a space area using this character. It is possible to search for a prediction signal out of the same frame as well as the prediction signal of a segment of time. This is called the prediction signal of a space area.

[0006]Since two pixel values which approach spatially are near, the prediction signal of a space area is generally in the position near an object signal. On the other hand, in the receiver or reproduction side, since there is no original image, the prediction signal needs to use the signal coded and reproduced in the past. It is necessary to generate the prediction signal of a space area at high speed from these two elements. It is because it is used for generation of a prediction signal immediately after decrypting a pixel value and reproducing.

[0007]Therefore, it is necessary to generate the prediction signal of a space area simply and with high precision. In coding equipment and a decoding device, the composition in which high speed operation is possible is required.

[0008]By the way, coding of image data has been widely used for many international standards, such as JPEG, MPEG1, H.261, MPEG 2, and H.263. Each of the latter standard has improved coding efficiency further. That is, although the same image quality is expressed, compared with the conventional standard, efforts to decrease further have been made in the number of bits.

[0009]Coding of the image data to an animation consists of intra-frame coding and prediction frame coding. Here, intra-frame coding says frame inner code-ization in one screen of a frame. For example, a continuous frame can be classified into the following three different types in a typical hybrid coding system like MPEG1 standard.

(a) Intra-frame (henceforth the I frame) one, the (b) prediction frame (henceforth p frames), and (c)

both-directions prediction frame (henceforth the B frame).
[0010]The I frame is independently coded with other frames, namely, the I frame is compressed, without using other frames. P frames are coded through detection and compensation of a motion by using the frame in front of one, in order to predict the contents of the coded frame (it is p frames.). The B frame is coded by using detection and compensation of the motion using the information from the frame of the succession which predicts the data of the contents of the information from the frame in front of one, and the B frame. A former frame and a following frame are the I frame or p frames. The I frame belongs to the Intra code mode. P frames and the B frame belong to the prediction code mode.